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# Tablet and Pill Coating

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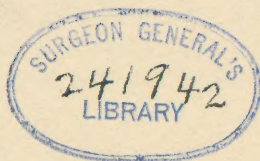
## PROCESS OF COATING TABLETS AND PILLS

AND OF

## MANUFACTURING PULVEROUS PILLS AND GLOBULES

By FRANCIS J. STOKES ✓  
PHILADELPHIA

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## TABLET AND PILL COATING

The process of coating tablets and pills has been surrounded with more or less secrecy and has in consequence been considered by those unfamiliar with it as quite difficult. It is in reality quite simple and can be mastered by anyone who uses ordinary judgment and common sense. The following instructions should be ample after a little experimenting, to enable anyone to undertake the work with assurance of success. There are several fundamentals to bear in mind which are set forth in the paragraph headed—GENERAL PRECAUTIONS.

Tablets were formerly coated by what is called the hot process, that is to say, they were placed in a revolving coating pan which had copper steam coils wound around the outside of the pan. This heated the pan and accelerated the drying of the syrup as it was applied to the tablets. A considerable portion of the syrup dried in a hard layer on the surface of the pan and was difficult to recover or was lost. It was later discovered, by blowing air upon the tablets, the drying took place about as rapidly, and little syrup was deposited on the surface of the pan. As a result the cold process, as it is termed, is now very generally used. In some cases warm air is used, which increases the rapidity of the drying. Warm air is not necessary, however, and many manufacturers use cold air rather than incur the expense of a heating box for heating the air. Steam heated pans are preferred by some for sugar coating those compounds such as contain bromides and other drugs which absorb moisture rapidly.

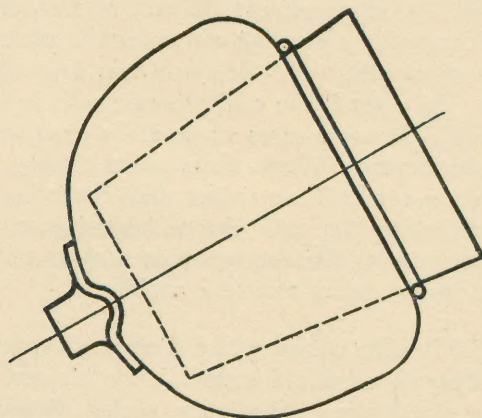
**EQUIPMENT**—The equipment of a coating department includes one or more coating pans, polishing pans, a fan blower, a syrup kettle or cooker, glass graduates, stirring rods, scales, dippers, workbench, drying closet, screens and containers for the stock solutions and powders.

**COATING PANS**—These can be of copper or galvanized iron, the former being preferred on account of their shape. The galvanized iron pans have corners where the sections are fastened together, in which the tablets are apt to stick, and their rolling action is not quite as satisfactory as in the copper pans. The size of the pan depends on the quantity of tablets to be coated at an operation. Usu-

ally a number of pans are used so different lots of tablets can be coated simultaneously in various colors. The most popular sizes of coating pans are those having a diameter of 24", 30" and 36". The capacity of the pan depends on the size of the tablets and the thickness of the coating. When the uncoated tablets are first placed in the pan, they may seem small in comparison to its size, but when the coating has been finished, the volume of the tablets will be greatly increased. This should not be overlooked when starting to coat. In the table below is given the maximum capacity in one-, three- and five-grain tablets.

Pan	One Grain	Three Grain	Five Grain
24" diameter	100,000	70,000	50,000
30"       "	150,000	125,000	100,000
36"       "	250,000	200,000	150,000

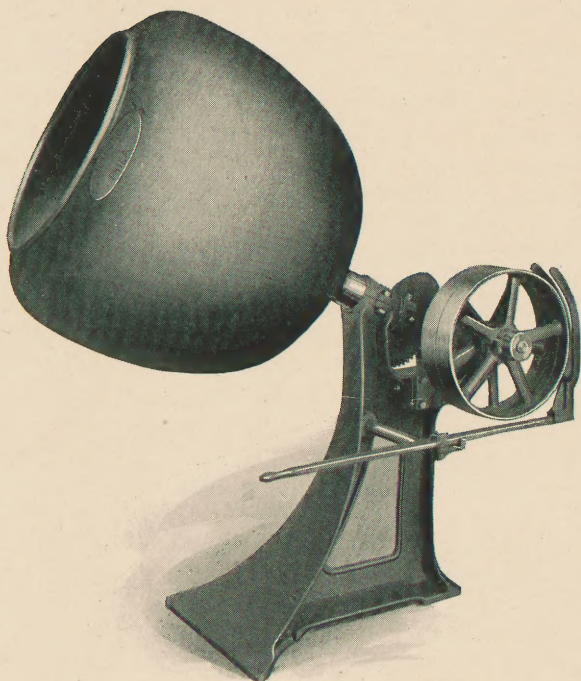
**POLISHING MACHINES**—One or more of the coating pans may be used as a polishing machine, or as is usually the case, a special machine like the Polisher illustrated on page 16, which has a canvas



**COATING PAN POLISHER**

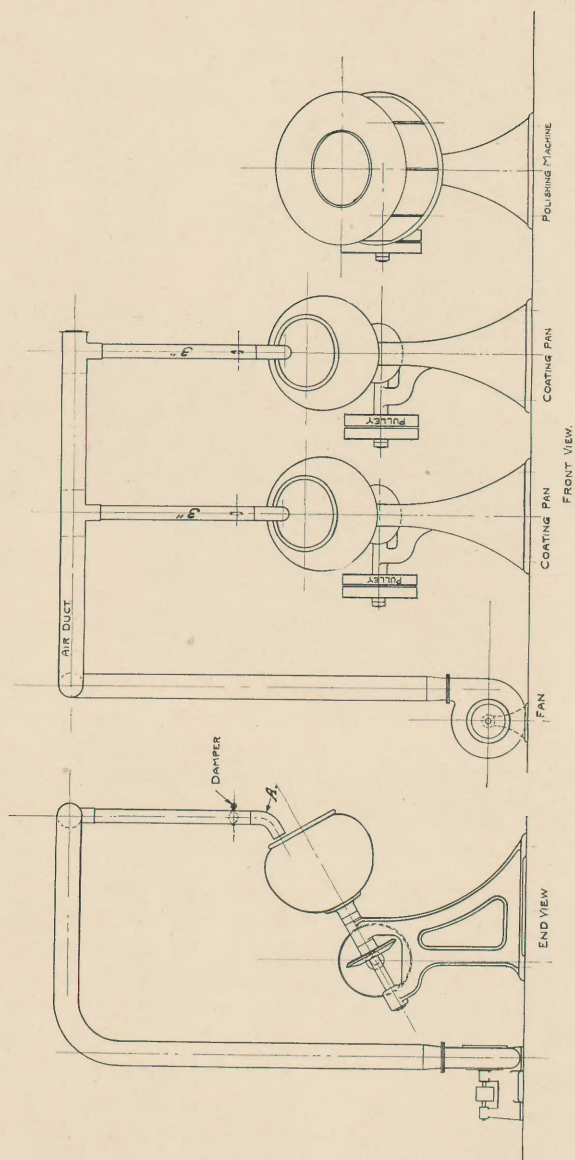
lining, is preferred. If a coating pan is used, it is lined generally with canvas. The canvas is cut so as to fit the pan and glued to it. As a coating pan is more expensive than a polishing machine, and as the labor involved in adapting the former for polishing is considerable, it is obvious that it is more economical to have a separate polishing machine or machines. One polisher is required for polishing white coatings, and can be used for no other color, as chocolate





COPPER COATING PAN

Copper coating pans are made in diameters from 24 in. to 48 in. the usual size being 24 in., 30 in. and 36 in. They are beaten from thick copper and are made very deep and so will carry a heavy load. These pans can also be equipped with steam heating coils.



ARRANGEMENT OF MACHINES IN COATING DEPARTMENT



and colored coatings stain the canvas lining, which would come off and discolor subsequent lots of white tablets. For the same reason one polisher is kept exclusively for chocolate coating and a third for polishing the various pink, blue, green and yellow colors. As the polishing process requires only a relatively short time, as compared to the actual coating process, three polishing machines will handle the output from many coating pans. An inexpensive arrangement which is satisfactory for small production, is to insert into the mouth of a coating pan a cylindrical container (see page 4), so shaped that it wedges in the opening of the pan. These can be made of galvanized iron and lined with canvas. Several of these can be had at small expense, and a coating pan can be immediately converted into a polisher by inserting one into the pan.

**FAN BLOWERS**—The standard type of fan blower of sufficient size to supply an air blast to the pans is required. I recommend a 15" Blower for one pan and an 18" Blower for three or four pans. This fan can be placed on the floor, or hung from the ceiling. A line of tin or galvanized iron piping of a size to fit the outlet of the blower is extended along the ceiling over the pans, and from this smaller pipes are extended down to the mouth of each pan. These drop pipes should be fitted with a damper so the air blast can be controlled, and a loose spout which can be removed when emptying the pan. The illustration on page 6 shows this arrangement of the pipes in relation to the pan. The standard gutter spouting with elbows and fittings as supplied by tinsmiths can be used. As stated above, some coaters prefer to blow warm air to hasten the drying, especially in humid weather. For heating, a steam coil or gas heater is placed in a closet and the suction inlet of the blower connected with the closet, which will meet all requirements.

**COOKING APPARATUS**—The stock gelatine solution and the syrup solution used for sugar coating tablets require heat in their preparation and application. A small steam jacketed copper kettle of three to five gallons capacity is very satisfactory for this purpose. A gas stove on the work-bench with suitable agate double-boilers will answer, however. The steam jacketed kettles or gas heaters should be conveniently situated, so the operator, when dipping out his solutions will not have to carry them far to the coating pans. The work-bench should be facing the pans, and with a suitable aisle between it and the pans. This makes a convenient arrangement. A drying closet will be found of great convenience for drying the tablets before they are placed in the coating pan, and also for drying those combinations referred to above which absorb moisture. A mortar and pestle are

convenient for preparing colored solutions, and should be a part of the equipment, together with pint and quart measures and glass stirring rods. The equipment is complete with a set of perforated sieves for separating the different sizes of tablets which may be coated in the same pan, at the same time for convenience and also for screening out broken tablets.

**PREPARATION OF STOCK SOLUTIONS AND SUB-COATING POWDERS**—Before the operator can commence to coat, he will have to prepare his gelatine solution for the under or sub-coating, and make his starch and sugar mixture, which is dusted on when forming the under or sub-coating. He will also have to prepare his syrup solution and his stock colors for coloring the syrup. The following formulae for these various solutions and powders have been found to give very satisfactory results. They are susceptible, however, of considerable variation, and the operator may decide to modify the formulae to suit his own ideas after he has become experienced. I find rarely two coaters who use exactly the same formulae.

**GELATINE SOLUTION FOR SUB-COATING** is prepared by dissolving two pounds of powdered or granulated gelatine and twenty-four pounds of granulated sugar in two gallons of warm water, mix thoroughly and bring to a slow boil. When thoroughly dissolved strain and put in a can or crock. Some coaters add to the above mixture twenty-four ounces of powdered acacia. This is not necessary, however, and the solution is stickier and harder to handle than without the acacia. The gelatine solution will gelatinize when cold, but will always go back into solution when heated, and should always be applied hot.

**WHITE DUSTING POWDER**, which is used in connection with the gelatine solution for sub-coating is a mixture of thirty-six pounds of powdered sugar and twelve pounds of powdered starch, mixed thoroughly and screened through a thirty-six-mesh sieve. Some coaters prefer to add two pounds of powdered talcum and two pounds of powdered acacia to the above. The talcum assists materially in producing a smooth sub-coating.

**CHOCOLATE DUSTING POWDER**, which is used for sub-coating chocolate-coated tablets, is the same as white dusting powder with addition of six pounds of powdered cocoa or powdered extract of chocolate. This dusting powder is screened in the same manner as the white. The dusting powders, or stock powders, as they are called, can be stored in galvanized or other suitable containers.



**SYRUP** used for coating after the sub-coating has been applied is composed of thirty pounds of granulated sugar dissolved in three gallons of water and brought approximately to the boiling point. The syrup is then strained through cheese-cloth and when cool is ready to use. This syrup is used in this form for coating white coated tablets. It is applied cold in all cases.

**COLORING SOLUTIONS FOR SYRUP**—If the coating of the tablets is to be colored, the syrup is tinted by adding to it aniline color prepared in the following manner: One ounce of powdered aniline is dissolved in one pint of hot water. These solutions which are afterward referred to as stock solutions, are usually prepared at first, and stored in separate bottles and kept ready for use.

**CHOCOLATE COLORED SYRUP**—This requires no previous preparation, as all that is required is to mix twelve ounces of chocolate-brown paste with one gallon of syrup, which is applied without further dilution. Some coaters, however, prefer to prepare a chocolate coloring mixture with which they color their syrup. The formulae is to mix one pound of chocolate-brown paste in three pints of hot syrup. This is stored in a wide-mouth stoppered container, and diluted in the proportion of four ounces to the gallon of syrup when applying the coating.

**WAX SOLUTION** used for polishing is made by dissolving one ounce of carnauba wax in one pint of acetone. Beeswax may be used, or preferably a mixture of one part carnauba to three parts beeswax. As beeswax, however, is frequently adulterated with paraffin, the oil from the paraffin gives trouble, and it is probably safer to use pure carnauba, unless the composition of the beeswax is known.

**TABLETS**—These should be compressed with high convex faces and with as thin an edge as possible, and at the same time conform to good proportions. Tablet punches are usually made with three degrees of concaved faces, called standard, deep, and extra-deep concave. The deep concave is a good one to adopt for all purposes, as it forms a satisfactory shape for either coated or uncoated tablets. The thinner the edge of the tablet the easier it is to cover it and the corners with the coating. The tablets should be screened to remove all broken ones, as well as dust, before placing in the coating pans.

**GENERAL DESCRIPTION OF THE PROCESS**—Before taking up in detail the various steps in coating tablets it will possibly give the beginner a better idea of what he is trying to do by briefly explaining the process. The tablets, after cleaning and removing defective ones,

are placed in the coating pan and subjected to three to five sub-coats, depending on the tablets. Each sub-coat consists first of wetting the tablets with the gelatine solution and when partially dry sprinkling with a dusting powder. By this means the tablets are rapidly filled out and rounded up. Following the sub-coating the tablets are given sufficient applications of syrup to give them a hard, smooth finish, the last two or three syrup coats, which are known as the finishing coats, receiving special attention. The tablets are then polished with the wax solution.

It is easier to coat tablets white than in any other color. Only a few syrup coats are required if the sub-coating has been properly done. Chocolate coating can be quickly done, as it also requires only a few syrup coats. Chocolate coating, however, may give the beginner some trouble to keep his colors uniform. This may occur if the finishing coats are allowed to dry too quickly. Colored coatings other than chocolate require a longer time to coat, due to the fact that the tint has to be obtained by slow degrees.

After the beginner has become familiar with the technique of coating he will find it economical to coat two or possibly three sizes of tablets in the same pan at one operation. It is obvious that this can only be done where the tablets have sufficient difference in their size to permit their separation by screening after they are coated. When this practice is followed it is advisable to sub-coat the different formulas or batches separately, and then syrup coat them together in the one pan. There are two reasons for sub-coating separately. One is to prevent the transfer of odor or powder from one formula to the other. The other is that where large and small size tablets are sub-coated together the small tablets are apt to stick to the larger tablets. This tendency is greater in the sub-coating, due to the heavier gelatine solution which is used, than with the syrup coating.

The formulae given above and the detailed instructions which follow are the best practice so far obtained. They no doubt can be modified to advantage in special cases, as well as improved, and the intelligent coater should always endeavor to simplify his work wherever possible, if by so doing he can produce a satisfactory result.

As an illustration, and to better explain the processes, let us assume that we are chocolate coating 70,000 three-grain cascara sagrada tablets. Use a 24" diameter coating pan if available, as it will be easier for the beginner to start with a pan which is in proportion to the size of the batch. A 30" diameter coating pan can, of course, be used. It is difficult, however, to coat a very small quantity of tablets in a large pan, as they will have an increased tendency to stick to the pan after each application of gelatine solution and syrup, and require more stirring to overcome this and to prevent their sliding before they commence to roll properly.



While the beginner will of necessity have to start with a clean pan, he will find later on that the sub-coating can be accomplished more readily by placing his tablets in a pan which is slightly encrusted with syrup from a previous coating. The reason is that the tablets, when moistened with the gelatine solution, will slide as one mass rather than roll, and they will require much more stirring by hand to break up the mass and start them rolling.

**SUB-COATING**—When the tablets are placed in the pan, have the gelatine solution for sub-coating warm and conveniently located. Dip out one pint in an agate measure and have a scoop full of chocolate powder at hand. As the tablets revolve, pour the gelatine solution over the tablets, stirring them with the hand to distribute the solution, keep stirring to make the tablets roll if possible, and when the gelatine has partially dried and is tacky, sprinkle on the chocolate dusting powder until there are no wet tablets showing. The chocolate powder can be sprinkled on by hand, and wet areas in the tablets can be sprinkled as they appear. The tablets will begin to roll freely as soon as the powder is dusted on. Avoid using an excess quantity of powder, as this will roll in the pan and affect the smoothness of the succeeding coat. Should excess powder accumulate it will appear at the back of the pan, and by scooping a few tablets from the front the powder and tablets at the back can be scooped out and separated, the tablets being put back in the pan. After the chocolate powder has been applied and taken up with the tablets, and not before, turn on the air blast until the coating is perfectly dry. This requires about fifteen minutes. The operator can test for dryness by scraping with his finger-nail or knife to see if it will powder off. Sometimes the tablets split or cap during the first sub-coating, and there are always a few tablets which stick together. It is advisable to rescreen tablets to insure the removal of such before applying the second sub-coating. Three or possibly four coats are applied to complete the sub, or under, coating. This sub-coating is very important, as upon it largely depends the smoothness of the finished tablets.

**SYRUP COATING**—After the tablets have been sub-coated, the chocolate syrup is applied. It is advisable to again screen the tablets to remove the broken ones, and if the pan is too rough from encrustation of sub-coating, wash it out. The color of the chocolate sub-coating will be much lighter than the color of the finished tablets. Fewer coats of the chocolate syrup will be required if the tablets are first given two small coats of chocolate syrup, having a double quantity of chocolate brown paste to intensify the color. Mix a pint of this intensified coloring syrup and apply it in two doses. It is difficult to state the exact amount of syrup a given quantity of tablets will take up; I should say about one pint would be the proper quantity for each application of

syrup to the quantity of tablets under consideration. The quantity of syrup, however, should be as much as the tablets will take up and not form into a mass so they do not roll. Pour this over the tablets as they revolve, distributing it as much as possible while pouring, and at the same time stirring with the hand until the syrup is evenly mixed and the tablets are rolling freely. Do not turn on the air blast until the tablets roll freely, and then blow air until dry, requiring approximately twenty minutes. There should be a distinct improvement in the smoothness of the coating after the first application of the chocolate syrup is added, and this improvement will become more pronounced as the applications are continued. After two coats of the darkened syrup, the operator can proceed with the standard chocolate syrup, applying as many coats as are needed to properly round the tablets, so the edges and corners are smooth and show a uniform color. From five to ten coats may be required to produce the necessary finish. If pin holes appear in the coating they can be filled in by allowing the syrup to dry more slowly, the theory being, the longer the coating remains in a plastic condition the more working it will receive by the rolling action of the tablets. The operator can tell from time to time how his tablets are smoothing up by breathing on a few held in the hand close to the mouth. This test reproduces the color and luster which will be obtained after they are polished with the wax solution. If the tablets do not show up smooth and polished when so tested, probably no amount of polishing will materially improve their appearance. This practice of breathing on the tablets is unquestionably to be condemned from a hygienic standpoint, but there seems no other way for the beginner to get a quick line on his results.

**FINISHING**—The tablets are now ready for finishing. If the pan is rough it should be washed out and dried. Give the tablets a light application—say, three or four ounces—of chocolate syrup, with the color, however, cut down two-thirds in quantity. The chocolate paste does not enter into solution with the syrup, as is the case with the aniline colors, and by reducing the amount of the chocolate brown paste in the three finishing coats, a harder surface is produced which takes a better polish. These finishing coats should be allowed to dry without the air blast. On the third or last coat, just before the tablets are dry, stop the pan and cover the opening with a cloth. By doing this the tablets will dry more slowly and retain a better and more uniform color than if they were revolved. It will be well to turn the coating pan a half revolution by hand from time to time to expose a fresh surface of the tablets. If this is not done, those tablets which are on top will dry a lighter color than those below. It will take about two hours to dry the tablets in a stationary basin. The operator may be able to use an air



blast for the final drying, but the pan must be stationary, except when revolved by hand in order to expose a fresh surface. This is a dangerous experiment, as it is liable to produce uneven colors.

**POLISHING**—The tablets should now be ready for polishing and are transferred to a polishing pan. While revolving in the polisher, pour two ounces of wax solution over the tablets. A wide-mouth bottle with a shaker top makes a good container for the wax solution. Two or three shakes of the solution should be sufficient. Stir the tablets with the hand in order to distribute the solution thoroughly through the tablets. Allow the tablets to revolve until the acetone has evaporated and then dust on from a shaker a small amount of talcum powder. The talcum is usually applied with the ordinary commercial shaker talcum box, and only two or three shakes are necessary. The luster, or polish, should appear immediately. It may be improved by a second or possibly a third application of wax solution and talcum. Leave the tablets in the polisher for fifteen or twenty minutes, or longer if desired. When removed from the polisher the tablets should be spread on trays and dried before placing in their containers.

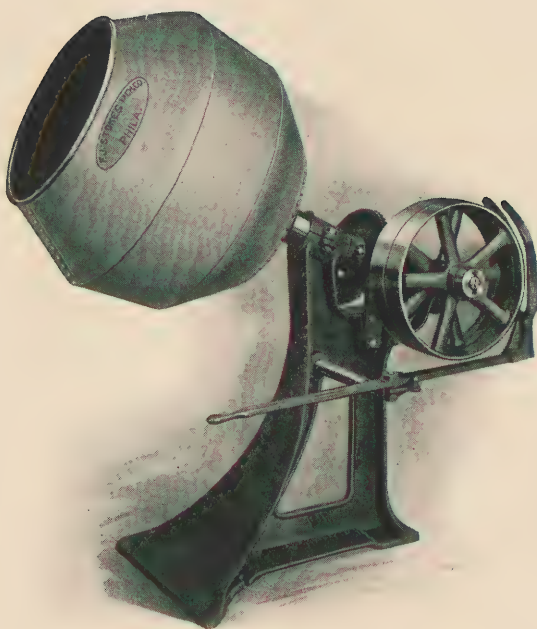
**WHITE COATING**—Tablets are white coated in the same way as they are chocolate coated with the exception that white dusting powder is used in place of the chocolate dusting powder when sub-coating. Plain syrup is used for the coating and finishing. Some coaters, in order to get quick results by producing the number of applications of syrup, load their syrup by mixing with it an additional quantity of powdered sugar. This sugar does not enter into solution and the mixture is made just as heavy as it is possible to pour and distribute over the tablets. By controlling the air blast this coating can be made smooth, and the finishing coats will be applied, using the standard syrup.

**COLOR COATINGS**—When tablets are to be coated blue, green, yellow or red, the same general method applies as described. The sub-coating is applied with white dusting powder, and syrup for coating and finishing is tinted with the proper coloring solution, the tint being intensified as the coating progresses. In other words, the first two or three coats are made by applying syrup of a light tint, the next three coats with syrup of a darker tint, and so on to the end. If the operator attempted to apply syrup tinted to the finished color from the beginning, the result would be a blotchy color, probably due to the fact that the sub-coating being absorbent would take up the color unevenly. As an example, take 100,000 one-grain tablets of strychnine and coat them red. Use a 24" pan, and after the tablets have been sub-coated white apply a syrup which has been colored in the proportion of one ounce of

stock red coloring solution to one gallon of syrup. Give the tablets two or three coats and then intensify the tint of the syrup by adding more red in the proportion of two ounces of stock color to the gallon of syrup. After several coats the color is again intensified by again doubling the proportion of color in the syrup. Always keep some sample tablets of the proper color before you as a sample to match. With a little experience the operator can intensify the color of his syrup by judging its color with his eye and without resorting to measuring the exact proportion. When the desired shade and finish have been obtained the air blast should be taken off and the tablets given three or four doses of colored syrup in the manner described for chocolate coating. The pan should be stopped just before the final coat is dry, the opening covered and the pan turned by hand from time to time, as explained above. The method for coating tablets in other colors is identical.

**SPECIAL TREATMENT FOR COATING TABLETS WHICH ABSORB MOISTURE**—Some tablets, owing to their contents, require greater care in coating to prevent the water in the gelatine solution penetrating the tablet rather than evaporating. It is obvious that such a result would prove disastrous, as this moisture, no matter how well the finished coating appeared on the outside, would eventually work out through the coating, discoloring it and producing a sorry result. It is therefore very essential that when coating sodium salicylate, mixed treatment, and those combinations containing iodides, bromides and other compounds having an affinity for water, care must be exercised to prevent the water "drying in." There are several methods in use. A small amount of oil applied to the outside of the tablets before applying the gelatine solution is one method. Too much oil must not be used or it will discolor the coating. If a dough is made by adding sufficient starch to a tablespoonful of raw linseed oil and the dough kneaded into a ball, and the ball allowed to roll with the tablets, they will absorb the oil from the dough. The ball will shortly break down and the powdered starch, after the oil has been absorbed by the tablets, will appear in the back of the pan. After this preparation the tablets can be sub-coated in the regular way. Another method is to apply the stock gelatine solution, but in place of the stock dusting powder to apply powdered calcined magnesia. It is advisable to apply an excess of this to be sure of absorbing the moisture in the gelatine solution. Another method which is similar to the above is to substitute powdered acacia as a dusting powder after the gelatine solution has been applied. When the three or four sub-coatings have been applied, the tablets should be dropped in trays of hot powdered starch and dried out for a few hours. The application of the coating can then proceed as usual. The important thing is to have the tablets dry at the start and also to dry them thor-





GALVANIZED IRON COATING PAN

Some varieties of pills and tablets can be handled in galvanized iron pans. They cost somewhat less and can frequently be used especially for cold process coating.

Standard sizes, 24 in., 30 in. and 36 in.



POLISHING MACHINE

The machine illustrated here is used for polishing or finishing sugar and chocolate coatings. The drum is made with a canvas body which can be easily removed. The canvas carries and transmits the wax nicely and yields slightly as the tablets roll, and does not chip off the coating. It is much more satisfactory than the metal polisher.

The heads are 30 in. in diameter and 14 in. deep. They will fit the coating pan stands (page 5) and can be used interchangeably.



oughly after sub-coating to eliminate any moisture which may have dried in.

**RE-COATING TABLETS**—While it is not anticipated the operator will have bad luck, this may occur now and then, and it will be necessary to re-coat the tablets in order to save them. Place the tablets in a dishpan and cover with water, stirring them with the hand until the edges of the tablets begin to appear. Pour off the water and cover the tablets with denatured alcohol to absorb the water. Drain off the alcohol and shake the tablets well in a sieve to remove the alcohol, then put in the coating pan and revolve with air blast. When dry they can be re-coated. It may be that the tablets will wash off irregularly and some will be larger than others. If this is noticeable, remove the larger tablets by screening and rewash them in water to reduce their size, or place the smaller ones in the coating pan and give them an extra coat to bring up to the size of the larger tablets.

**TIME REQUIRED FOR COATING**—This obviously depends on the skill of the operator; as the skill in applying the sub-coating increases few syrup coats are required. It is also obvious that if the operator is able to load his syrup with free powdered sugar, the coatings will build up more rapidly and fewer be required. I know of some coaters who turn out a batch of the ordinary run of tablets in five hours, while others require a day or possibly more. Speed in coating, however, is not the chief end to be gained; the operator should rather be sure that his coatings are permanent, will not break off and will not discolor due to moisture in the tablets working out through the coating.

**GENERAL PRECAUTIONS**—Be sure each coat is perfectly dry before putting on another application, whether it be sub-coating or syrup, as the moisture will dry in and the result will be a cracked or discolored coating. Always screen the tablets after the first two applications of sub-coating to remove broken tablets. If these are not removed they will stick to the tablets and produce an unsatisfactory result. When the coating pan gets rough inside from too much syrup drying on it, wash it out and the tablets will coat up much better. When making white coating, keep away from chocolate coating, as the dust will fly from one pan to another and the white coating will be specked. Be sure the hands are clean and not stained with chocolate or other colors.

**SUGARLESS COATING**, which is recommended for tablets or pills distributed in tropical climates, is made by applying gelatine solution in place of syrup. The process is quite similar to that of sub-coating, in that a dry powder of chalk or starch is added to the tablets

after they have received an application of gelatine solution. The dusting powder should contain some powdered gum tragacanth. The coating is finished with several applications of gelatine solution alone. This coating cannot be polished with wax, but after the tablets have been allowed to roll in the pan for a few hours a very high luster can be obtained by giving the tablets a coat of very thin solution of balsam tolu. Wood alcohol can be used as a thinner.

**METHOD OF MAKING PULVEROUS PILLS**—These are made in a standard coating pan. No heat is required. As starters, either rape seed or sugar granules, which are sometimes known as imperials by confectioners, and are identical with the small granules used by homeopathic pharmacists, are used. Of the two kinds of centers or starters, rape seed is frequently preferred, as it becomes indistinguishable from the pill when made. The sugar granule, on the other hand, can usually be detected when the pill is broken open.

The starters are placed in the pan and an application of white paraffin oil is added; the powdered drug is then sifted or sprinkled onto the oiled centers as they revolve. The powder adheres to the centers and successive applications of oil and powdered drug are added until the pills are built up to the desired size. It is necessary during the process to remove the pills from time to time and screen out the larger ones, putting back the smaller in the pan until they are all brought up to an even size. When the pills are built up to the proper size the oil can be removed by placing them in a drying closet on absorbent paper which will absorb the oil as it sweats out. Some manufacturers prefer to remove the oil by placing the pills in a bath of tetrachloride of carbon, which dissolves the oil. Pulverous pills can be sugar or chocolate coated in the usual manner. The equipment consists of a standard coating pan and an assortment of perforated zinc screens. For the extensive production of pulverous pills special wooden tubs, four or five feet in diameter, are used in place of the standard coating pan. These tubs are mounted on the regular coating pan frame.

**METHOD FOR PREPARING HOMEOPATHIC GLOBULES OR GRANULES**—Place five pounds of XXXX sugar on a 24" copper coating pan, having steam coils for heating. A hot-air blast, however, could be used successfully in place of the steam coil. To the sugar add slowly a hot syrup of about 35 degrees density. This syrup can be approximated by dissolving two pounds of sugar in one pint of boiling water.

The syrup is slowly added to the powdered sugar as it revolves in the pan until the globules start to form. If too much syrup is added



large globules will form instead of small ones; the small ones are the more difficult to produce. Alternate applications of powdered sugar and syrup are added as the globules form and dry out. It will be necessary to remove the larger globules by screening, the small globules being put back in the coating pan. Those of the correct size are set aside on a tray for further drying, and those which are too large melted down into syrup.

The operator will have to keep stirring the sugar in order to break it up and to separate the globules as they form. The formation of too large granules can be overcome by adding less syrup or making it slightly lighter in density.













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